

TAXONOMIC HISTORY, REDISCOVERY, AND ASSESSMENT OF THREAT STATUS OF *STREBLUS ILICIFOLIUS* (MORACEAE) FROM INDIA

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ABSTRACT

Streblus ilicifolius (S. Vidal) Corner was reported first time in 1914 from Lushai Hills, the present day Mizoram state of India. For 96 years, this was the only known record for the species from India. In this paper, the rediscovery of *S. ilicifolius*—after a gap of nearly 100 years—is reported, and the report represents a state new record to the north-eastern state of Meghalaya. The collection history, taxonomic description with illustrations and distribution map, habitat characteristics, associated species, and threat status of the species are presented.

RESUMEN

Streblus ilicifolius (S. Vidal) Corner se citó por primera vez en 1914 de las Lushai Hills, actualmente estado de Mizoram de la India. Durante 96 años, este fue el único registro de la especie de la India. En este artículo se cita el redescubrimiento de *S. ilicifolius*—después de un intervalo de casi 100 años— y la cita es nueva para el estado nordestino de Meghalaya. Se presenta una historia de la colección, descripción taxonómica con ilustraciones y mapa de distribución, características del hábitat, especies asociadas, y estado de amenaza de la especies.

INTRODUCTION

The genus *Streblus* Lour. comprises 25 species (Mabberley 2008; Berg et al. 2006) distributed mostly in tropical and subtropical Asia (Haridasan & Rao 1987). In China, the genus is represented by seven species viz., *S. taxoides* (Roth) Kurz, *S. tonkinensis* (Dubard & Eberhardt) Corner, *S. asper* Lour., *S. indicus* (Bureau) Corner, *S. zeylanicus* (Thwaites) Kurz, *S. ilicifolius* (S. Vidal) Corner and *S. macrophyllus* Blume (Fu et al. 2003). There are four *Streblus* species in India viz., *S. asper*, *S. ilicifolius*, *S. zeylanicus*, and *S. indicus* (Haridasan & Rao 1987). Only two species viz., *S. asper* and *S. ilicifolius* were reported from north-eastern India by Kanjilal and Bor (1940). While *S. ilicifolius* was restricted only to one site in Lushai Hills, *S. asper* was reported to have more common occurrence in the former undivided province of Assam (Kanjilal & Bor 1940). Haridasan and Rao (1987) also reported the occurrence of *S. asper* from Baghmara in Garo Hills of Meghalaya.

Streblus ilicifolius (S. Vidal) Corner has not been collected and/or reported by any worker since its first report by U. Kanjilal in 1914 (ASSAM herbarium/Accession no. 28476, 28477 & 28478) from Lushai Hills in northeastern India under the name *Balanostreblus ilicifolia* Kurz. These accessions were renamed by G.K. Upadhaya in 2008 as *Streblus ilicifolius* (S. Vidal) Corner. The species has a very restricted occurrence, and is found only on calcareous habitat. The occurrence of *S. ilicifolius* in Meghalaya has been recorded and is reported for the first time, thereby extending the known distribution of the species in South-East Asia.

MATERIALS AND METHODS

During the floristic exploration of Nongtraï and its adjoining areas in Shella, Meghalaya, specimens of *Streblus ilicifolius* (Fig. 1A) were collected, processed, and housed in the ASSAM herbarium at Botanical Survey of India, Eastern Regional Circle, Shillong, Meghalaya. During the survey, the habitat conditions, associated species as well as biotic and abiotic pressures to which the species is exposed to were also recorded. Based on the population data, and habitat characteristics, the species was assessed for threat category following 2001 IUCN Red List Categories and Criteria version 3.1 (IUCN 2001) and Guidelines for Using the IUCN Red List Categories and Criteria (IUCN 2010).

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RESULTS

After critical observation of the newly collected specimens, and comparison with the existing herbarium specimens housed at ASSAM, and the original description, the identity of the species was confirmed as *Streblus ilicifolius* (S. Vidal) Corner. The location map and photographs of live and herbarium specimens of the species (Fig. 1) along with a line drawing (Fig. 2) are given.

TAXONOMIC TREATMENT

Streblus ilicifolius (S. Vidal) Corner, Gard. Bull. Singapore 19:227. 1962. *Taxotrophis ilicifolia* S. Vidal, Revis. Pl. Vasc. Filip. 249. 1886.

Taxotrophis obtusa Elmer, Leafl. Philipp. Bot. 5:813. 1913.

Taxotrophis triapiculata Gamble, Bull. Misc. Inform. Kew 1913. 188. 1913.

Taxotrophis aquifolioides W.C. Ko, Acta Phytotax. Sin. 8:353. 1963.

Balanostreblus ilicifolia Kurz, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 42:248. 1874.

Pseudotrophis laxiflora Warb., Bot. Jahrb. Syst. 13:295. 1891.

Bushy scandent spinous shrubs, 2.5–3 m tall, often gregarious in patches; dioecious; stems solitary, few branched, dark brown; bark grayish white, smooth, with latex; branchlets glabrous, divaricate or angular; spines straight, 1–2 cm long; stipules tapered, 0.4–0.5 cm long, caducous. Leaves mostly solitary, longer than broad; leaflets alternate, distichous, 1.4–5 cm long, 0.6–2.5 cm wide, elliptic to oblong-obovate, thickly leathery, the abaxial surface dark green, with cystoliths, the adaxial surface light green, glabrous and shiny, the margin loosely revolute, with 5 or more spiny teeth, the apex acute, blunt, with 2 or 3 spiny teeth, the base cuneate to decurrent; the midveins conspicuous on both sides and the abaxial surface prominent; the secondary veins pinnate, the abaxial surface inconspicuous, the adaxial surface slightly depressed; petioles 0.3–0.4 cm long, transversely verrucose. Male inflorescences axillary, cylindric catkin-like spikes, spicate, 0.5–1.2 cm; the bracts conspicuous, imbricate, margin dark. Female inflorescences shortly spicate, in pendent racemes, 2 to 6-flowered; the bracts minute. Male flowers: shortly pedicellate; perianth lobe 4, free, ± orbicular, margin inflexed and ciliate; pistillode 3.2–3.5 cm long, branched. Female flowers: perianth lobe 4, opposite, outer 2 smaller; ovary oblique, fleshy, glabrous. Fruits: drupes on brachyblasts, globose, 0.8–1.2 cm long, 0.8–1.1 cm wide, with persistent bracts, half enclosed by the persistent perianth lobes.

Habitat, Distribution, and Phenology.—The species was recorded at an elevation of 47.5 m a.s.l. in tropical forest of Phlangkaruh in Nongtraï area, Shella (Fig. 1). It grows in limestone areas, and on rocky substratum. The altitudinal distribution range of the species is 40–500 m a.s.l. The species is distributed in Meghalaya and Mizoram (Lushai Hills) in India, Bangladesh, China, Indonesia, Malaysia, Myanmar, Philippines, Thailand and Vietnam. The species flowers in March–April and fruits in May–June.

Voucher specimens: **INDIA. Meghalaya:** Nongtraï village in East Khasi Hills district, 25°11.171 N & 91°37.202 E, 30 Oct 2010, Singh *et al.* 74965 & 74966 (ASSAM). Additional specimens examined: **INDIA. Mizoram:** Lushai Hills, Jul 1914, Kanjilal 28478, 28476 & 28477 (ASSAM).

Threatened Status.—Not yet evaluated by IUCN. In spite of repeated search in the entire state of Meghalaya in 10 km × 10 km grids, only one population with 6 individuals of the species could be located in Nongtraï village. All the individuals in this locality were adults and were in fruiting stage. No seedling and sapling of the species was encountered, indicating poor regeneration of the species. One of the important features of the habitat of this species population was Karst topography. The main features of Karst topography are limestone terrain, and the absence of surface water flow. The species was classified from threat perspective based on population size, extent of occurrence, area of occupancy, and habitat quality (Table 1) following 2001 IUCN Red List Categories and Criteria version 3.1 (IUCN 2001). The species was classified as “Critically endangered” [CR A1. (a, b, c, d); B2. a, b (ii, iv, v); C2.a (i)].

DISCUSSION

With this new report of the species from Meghalaya, and rediscovery after nearly 100 years of its first report

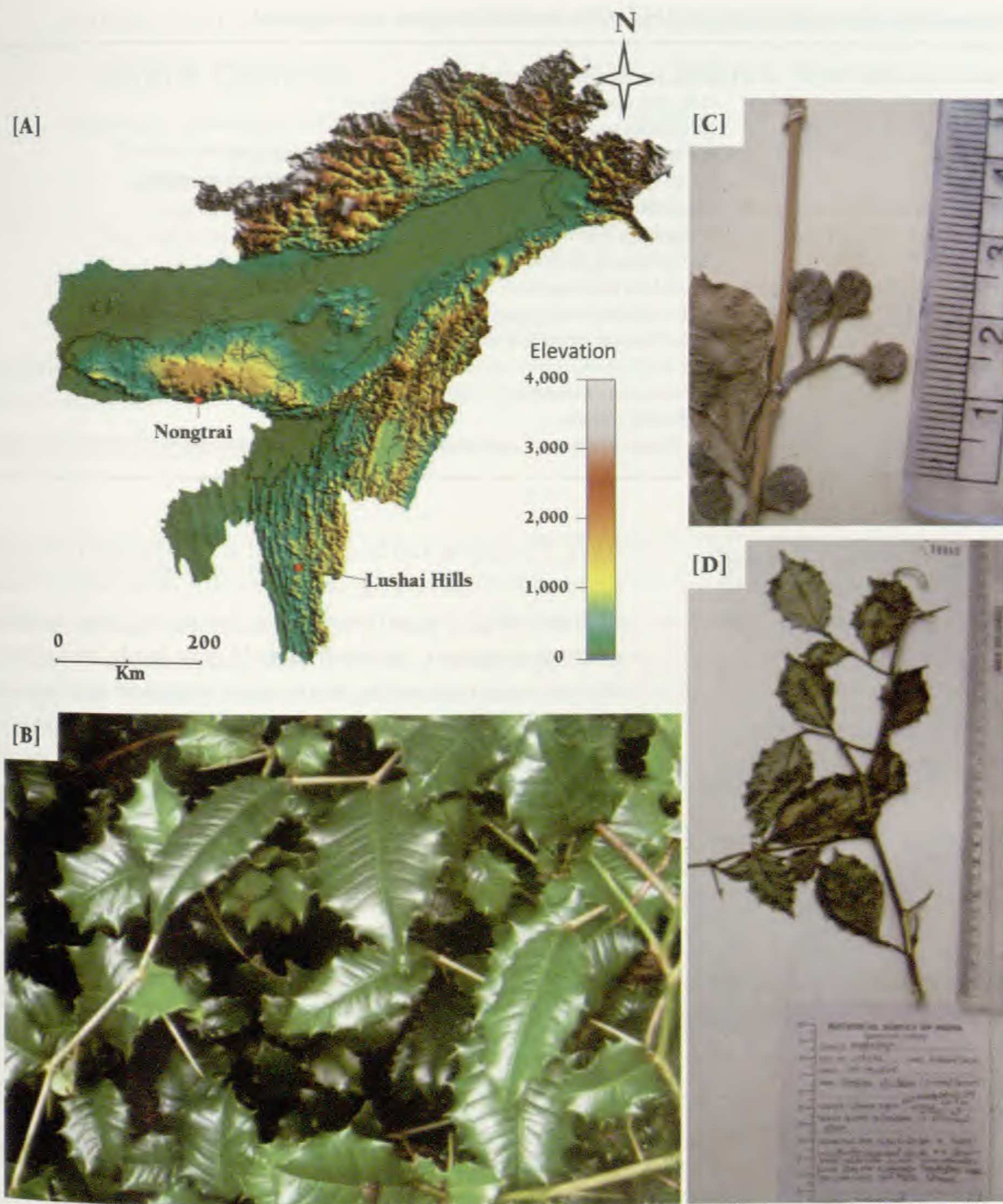


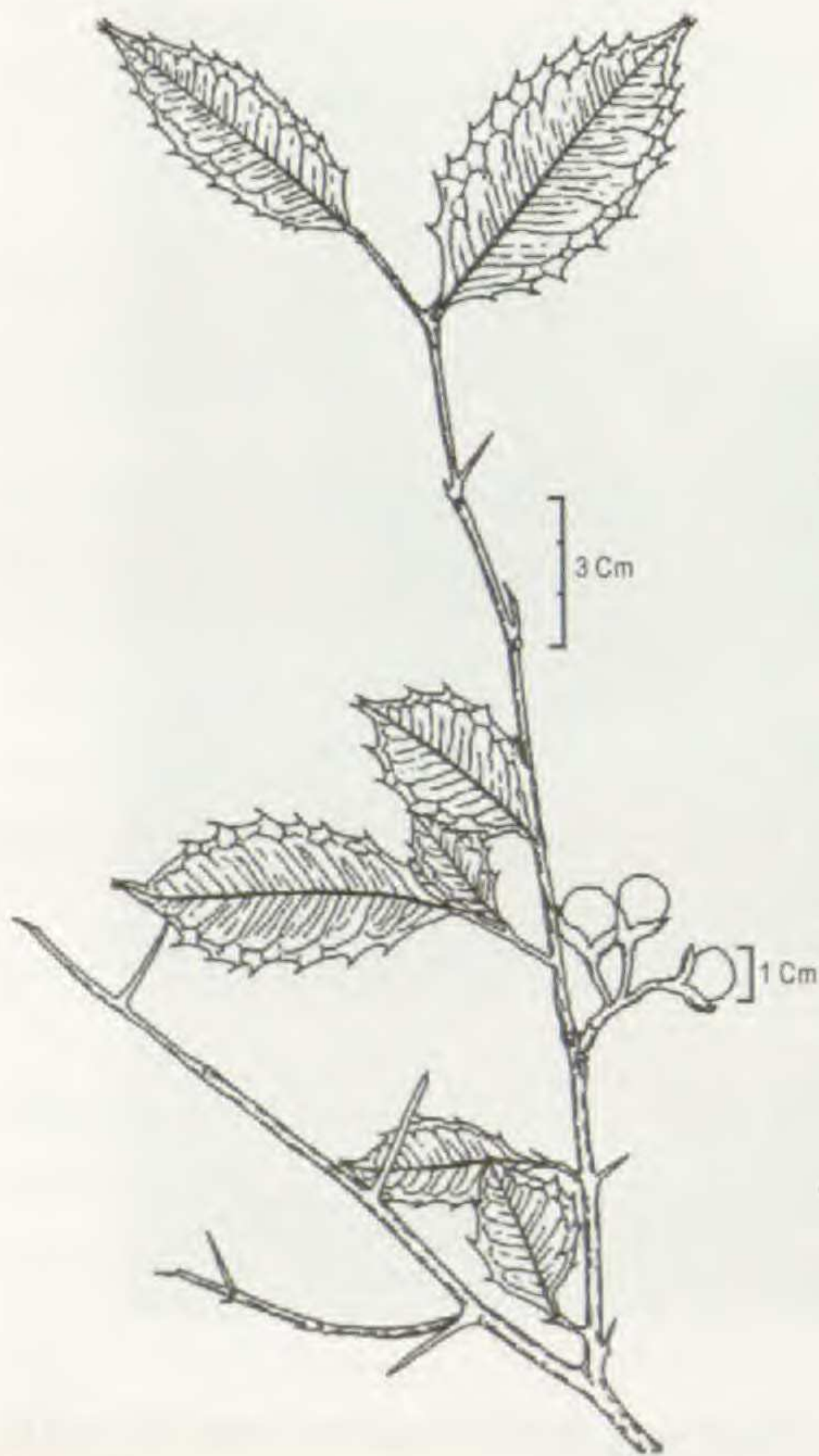
FIG. 1. A. Map of northeastern India showing locations (●) of *Streblus ilicifolius*, B. Close view of the plant, C. Herbarium specimen with fruit, and D. Herbarium specimen with vegetative growth.

from India, the existence of the species in the country is confirmed along with new extension of its geographical distribution area. The plants were growing in calcareous and moist under-canopy habitat. The associated species were *Breynia rhamnoides* Muell.-Arg., *Ficus hirta* Vahl, *Tetrameles nudiflora* R. Br., *Caryota urens* L., *Bauhinia purpurea* L., *Alstonia scholaris* (L.) R. Br., *Antidesma acuminatum* Wight, *Artocarpus heterophyllus* Lam., *Brassaiopsis glomerulata* (Blume) Regel, *Cayratia pedata* (Lam.) Juss. ex Gagnep., *Duabanga grandiflora* (Roxb. ex DC.) Walp.

The habitat of *S. ilicifolius* is increasingly exposed to disturbance due to forest clearance for large scale mining. Besides, small scale private limestone quarrying is also destroying the natural habitat of the species. In view of high intensity of disturbance to its natural habitat, and poor regeneration as observed in the field, the species might become extinct in the near future, unless adequate conservation measures for the species are

TABLE 1. Population data for *Streblus ilicifolius* used for classification of threatened categories of species as per IUCN (2010).

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|--------------------------------------|--|
| A. Population reduction | A1. $\geq 30\%$ decline per generation (a) Direct observation: very less occurrences (b) Density per 10 m^2 : 1 individual (c) Quality of habitat: disturbed, fragmented, karst topography (d) Exploitation: exposed to disturbance due to limestone mining |
| B. Geographic range | B2. Area of occupancy (AOO): $< 10\text{ km}^2$ (a) Severely fragmented, 1 location (b) Continuing decline (ii) Area of occupancy: 100 m^2 (IV) Number of locations: 1 (v) Number of mature individuals: 6 |
| C. Small population size and decline | Number of mature Individuals: < 250 C2. Continuing decline (a i) Number of mature individuals in each subpopulation: < 50 |

FIG. 2. Line drawing of *Streblus ilicifolius*.

taken. The species can be conserved in situ through habitat protection and by undertaking several ex situ conservation measures such as multiplying and introducing the species in the wild through micro-propagation, establishing field gene banks and conserving the species in the existing institutional botanical gardens. Considering the poor regeneration of the species in nature, there is a need to understand the reproductive biology and ecology of the species to ensure its perpetuation in natural as well as introduced habitats.

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